

but the fact remains that the behaviour of cut and dressed stone in a town building is very different from that of the rock in its native habitat. Besides, occasions will continue to arise when some sort of test is required to confirm an architect in his opinion and give him peace of mind; for none is so timid as an architect with a new and untried stone.

Except for the purpose of discovering first principles, there is practically no need to test stones that have been long in use and are well known. The quality of the untried stone does require proving. To do this satisfactorily we need sound criteria founded upon knowledge of the properties of stones already used; and we should distinguish between those parts of a structure subjected to the continued influence of moisture and those which are relatively dry.

Prof. Hirschwald has been engaged for many years upon an examination of the weather-resisting properties of German stones, as exhibited in old buildings, and by the application of great ingenuity and patience he has been able to trace the influence of the individual properties of the stone upon its durability. Upon this sound basis of experience he has formulated a very thorough-going scheme of stone-testing which, while it aims mainly at determining the degree of weather-proofness, at the same time embraces all the tests necessary for the estimation of mechanical strength.

The method used by Prof. Hirschwald is to range a large number of stones obtained from buildings into about nine grades of quality, according to their present condition, the age of the structure being taken into account. He has then examined their petrological characters, porosity, degree of softening in water, resistance to frost, and their mechanical properties both before and after soaking and freezing. By correlating the observed results with the quality scale, and eliminating the effect first of one character and then of another, he is able to state numerically the value of any one of the structural and mineralogical peculiarities of the stone.

As the result of this laborious preliminary work we have before us a means of estimating the probable weatherproofness of a stone within closer limits and with greater certainty than has hitherto been possible.

Prof. Hirschwald's earlier book, "Die Prüfung der natürlichen Bausteine auf ihre Wetterbeständigkeit," published in 1908, was out of print in the following year. The present work is practically a new and revised edition of the earlier one. Its division into two volumes of smaller size, of which vol. i. has appeared, is a great

gain to the comfort of the reader. To save expense, some of the larger plates of the earlier single volume are discarded in favour of figures in the text without any disadvantage. The work has been improved by the addition of process blocks illustrating the apparatus actually employed at the Charlottenburg laboratories, also by a fuller consideration of the tests for determining resistance to pressure, bending, shearing, and abrasion. As before, it is a storehouse of interesting numerical data concerning the properties of stone.

OUR BOOKSHELF.

A Guide to the Fossil Invertebrate Animals in the Department of Geology and Palaeontology in the British Museum (Natural History), Cromwell Road, London, S.W. Second edition. Pp. x+185+7 plates. (London: Printed by Order of the Trustees, 1911.) Price 1s.

THE second edition of Dr. F. A. Bather's guide will be even more useful than the first. It serves the student, who may never enter the British Museum galleries, as an introduction to invertebrate palaeontology, since the structure and habits of each class of animals are described, before the fossil remains are dealt with. The introductions to Trilobita and Cephalopoda may be specially mentioned. The interesting discovery of the dimorphism and double mode of reproduction of many foraminifera is stated on p. 24, with particular reference to the Nummulites. *Dibunophyllum* is assigned "stratigraphical importance" on p. 54. A new drawing of the under surface of *Eurypterus Fischeri* appears on p. 87. We note that the class Arachnida, including the Mero-stomata, intervenes between the trilobites and the Crustacea. The Crustacea receive more attention than is usually given to them; the interest of the beginner in palaeontology often falls off when he has mastered the structure of the trilobites. Crabs and lobsters then appear to him altogether trivial; Dr. Bather, however (p. 100), attracts us happily to the primitive Dromiacea, and thence to the evolution of the crabs that are now familiar to us.

The Brachiopoda follow the Arthropoda, and we finally pass to the Mollusca, the Cephalopoda being allowed thirty well-illustrated pages. The illustrations throughout are excellent, and cover fields of structure usually reserved for large and expensive textbooks.

The language employed is so accurate that one does not at first realise how much matter has been compressed into a single sentence. The comparison between the structure of a starfish and that of a sea-urchin (pp. 68 and 71) may be taken as an example. The term "flagellated chamber" on p. 29 seems a case where compression leads to inexactitude. On p. 74 we do not think that the author means to say that "some urchins seem to have taken to moving generally

in a single direction"; we gather that, like the regular forms, they moved in various directions, but with a selected part of the test directed forward.

G. A. J. C.

The Identification of Organic Compounds. By Dr. G. B. Neave and Dr. I. M. Heilbron. Pp. viii + 103. (London: Constable and Co., Ltd., 1911.) Price 4s. net.

THE identification of organic substances—a matter of obvious interest and importance—stands in a somewhat different category from that of inorganic compounds, for we are not concerned here so much with the elementary constituents of the substance as with the recognition of the compound itself. Moreover, we are restricted in our method of treatment by its nature; energetic reagents or high temperatures cannot be used for fear of destroying it. This fact and the absence of any detailed method of procedure (it is impossible to compile a compact analytical table) lend to the process much of the educational value of an original investigation.

The change in the scheme of practical examinations introduced by the Board of Education and other examining bodies in recent years has fortunately directed attention to the advantages of this kind of practical organic chemistry as contrasted with the old system of "spotting," by the aid of a few hasty and generally meaningless tests, one or two out of a short list of organic compounds enumerated in the syllabus. It has also led to the appearance of a number of little laboratory guide-books for the use of students. The volume under review is one of the latest of these publications, and, it may be added, fulfils its purpose, which is to prepare candidates for the intermediate and final examinations of the Institute of Chemistry. It is divided into sections, describing in more or less detail the way in which the substance should be examined; first the tests for the elements are given, then those for ascertaining to which group the substance belongs.

The physical constants and chemical properties of a very large number of common, and also of some uncommon, substances are given, so that the student need lose no time in hunting for them in a reference book. In short, the road which leads him to his goal is so well furnished with guide-posts that with a little intelligence and care he need never lose his way. From this point of view the book is entirely satisfactory; it is clearly written, and the information is sound and explicit.

J. B. C.

East London. By G. F. Bosworth. Pp. x + 256.
The Isle of Man. By the Rev. J. Quine. Pp. x + 178.
Carnarvonshire. By Prof. J. E. Lloyd. Pp. xi + 171.
Monmouthshire. By H. A. Evans. Pp. x + 183. (Cambridge County Geographies.) (Cambridge: University Press, 1911.)

THESE additions to the series of County Geographies deal with four areas almost as widely unlike as could be found among British counties.

East London, a somewhat artificial division of the accidentally-delimited County of London, affords little scope for real geographic treatment, and even that little has not been fully taken advantage of by Mr. Bosworth. Why the Thames has always been so important in trade, and why the nucleus of London was situated just where it is, are two questions not so fully answered as they might have been, and it is disappointing to be told in a geographical work that "it was mainly owing to them [the craft-guilds] that London became the first industrial and commercial city in the kingdom." As a topographical and historical description of the City and the county east thereof, the work is well done, and can be recommended to all interested in its area. We have not noticed any of the common errors of works on London, but the statement that London stone "was very greatly esteemed" in the Middle Ages is rather cryptic, and portions of the first paragraph in chapter II ought to have been placed within quotation-marks.

The only feature in common between London and the Isle of Man is the diminishing population, but how different is the meaning of the statistics in the two cases! If the latter is a county (which we doubt), it is the most natural of all counties. With a geographical unity, plain physical subdivisions, and an independent history, it has given Canon Quine the opportunity for producing a most interesting book. It is to be regretted that the account of the geology in the text refers to the Old Red Sandstone rocks that in the map are placed as Basal Carboniferous, and that Fig. 3 in the statistical diagrams is not adequately explained.

Monmouthshire, with its marked contrasts of industrial west and agricultural east, and Carnarvonshire, the county of Snowdon and slate, are both admirably dealt with by Mr. Evans and Prof. Lloyd respectively.

Moths of the Months and How to Identify Them. By the Rev. S. N. Sedgwick. Pp. 60. (London: Charles H. Kelly, 25-35 City Road, 1912.) Price 1s. net.

THIS little book is uniform with previous books by the same author on Birds' Eggs and Nests and Butterflies, and on Wild Flowers by Hilderic Friend. It will be very useful to young entomologists as an introduction to larger works on the subject, for the preliminary instructions relating to collecting, observing, breeding, &c., are very complete; and though the numerous figures are not all equally good, the greater part are easily recognisable. Remarks on classification are confined to brief notices of the principal groups and families; species are referred to by their English names and the Latin name of each, generic names being omitted. Under each month a selection of the most representative Sphinges, Bombyces, Noctuids, and Geometræ are enumerated, the Micro-Lepidoptera being thus excluded. One hundred and twenty-nine species are described and figured.